

**APPENDIX E.**  
**ALTON COAL TRACT LEASE BY APPLICATION GREATER**  
**SAGE-GROUSE MITIGATION PLAN DRAFT**

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# **ALTON COAL TRACT LEASE BY APPLICATION GREATER SAGE-GROUSE MITIGATION PLAN**

## **DRAFT**

Prepared for

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## 1. BACKGROUND

In November 2004, Alton Coal Development, LLC (ACD) filed a Lease by Application (LBA) to mine federal coal near the town of Alton, Utah (Case Number UTU 081895). This application was filed under the regulations of 43 Code of Federal Regulations (CFR) 3425, Leasing on Application. The original application included nearly 2,723 surface acres and approximately 38 million tons of recoverable coal. The Bureau of Land Management (BLM) reconfigured the tract to exclude approximately 40 acres and to include approximately 898 additional acres. Acreage added to the tract during tract reconfiguration was based on the identification of additional recoverable coal reserves not included in the original LBA and on additional surface acreage deemed necessary for mine operations. The Alton Coal Tract LBA (hereafter the Alton Coal Tract or tract), as reconfigured, contains approximately 3,577 surface acres and approximately 49 million tons of recoverable coal reserves (Figure 1). The reconfigured tract is the tract under consideration in the Proposed Action of the Alton Coal Tract LBA environmental impact statement (EIS) process.

Public scoping on the LBA tract was conducted in 2006 and 2007 and is detailed in the *Alton Coal Tract LBA EIS Public Scoping Report* (SWCA Environmental Consultants [SWCA] 2007). The BLM issued a draft EIS (DEIS) in November 2011 that considered one action alternative (Alternative C) in addition to the Proposed Action (BLM 2011a). A supplemental DEIS (SDEIS) has been completed (BLM 2014). The BLM decided to prepare an SDEIS based on, among other things, the need to analyze in detail Alternative K1, which had been dismissed from detailed analysis in the DEIS. This alternative is now being considered in detail largely to address public and agency concerns regarding impacts to the Greater Sage-Grouse (*Centrocercus urophasianus*) population, noise and visual impacts to the town of Alton, and issues related to conflicting land uses (agriculture versus surface mining).

ACD was issued a permit by the State of Utah on October 19, 2009, and began mining on the Coal Hollow Tract, located on private lands adjacent to the Alton Coal Tract, in late 2010. As the permitting agency, the Utah Division of Oil, Gas, and Mining (DOGM) required mitigation actions that focus on minimizing impacts to Greater Sage-Grouse (hereafter *sage-grouse*) and enhancing habitat. These actions are detailed in Volume 3 of the *Coal Hollow Mining and Reclamation Plan* (ACD 2009, Appendix 3-5), and have been ongoing since mining began.

To date, the following have been accomplished or are on-going as mitigation projects in the Alton–Sink Valley under the Coal Hollow permit:

- Vegetation treatments consisting of conifer removal and sagebrush restoration (including the establishment of a core conservation area, connectivity between habitat patches, and restoration of a lekking area)
- Activities to shift mating activities away from the historic lek
- Predator control
- Employee wildlife awareness education

The status and use by sage-grouse of completed vegetation treatments projects are described in Section 3.18.3.4.2 of the SDEIS.

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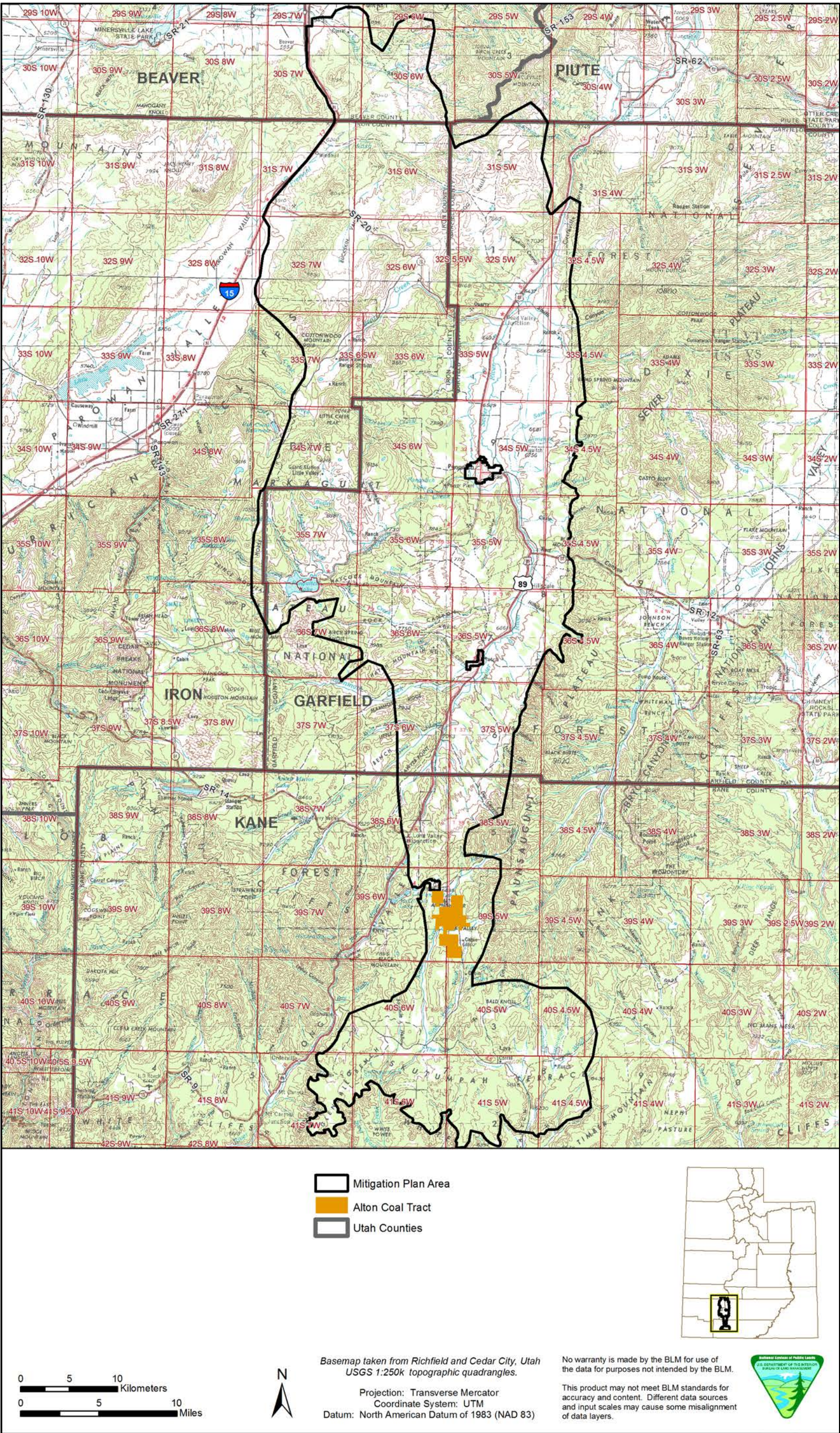


Figure 1. Alton Coal Tract location .



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## 2. PURPOSE

This plan will remain in draft form throughout the leasing decision process associated with the Alton Coal EIS. It will be finalized during the permitting stage, with ongoing input from U.S. Fish and Wildlife Service (USFWS), Utah Division of Wildlife Resources (UDWR), and DOGM.

The purpose of this plan is to describe the strategy for avoiding and reducing impacts, where possible, to the sage-grouse populations potentially affected by leasing and mining the Alton Coal Tract, in accordance with the guiding regulations summarized below. The requirements of this plan are applicable to all action alternatives except where the configuration of the action alternative makes certain requirements of this plan unnecessary. If the BLM's decision following the EIS process is to offer the tract for competitive leasing, the requirements of this mitigation plan would be incorporated as design features appropriate to the alternative selected. These design features would be reflected in lease stipulations as part of a lease contract after a record of decision (ROD) is issued.

This mitigation plan describes the following:

- Plan goals
- Guiding regulations specific to this plan
- Potential impacts on the sage-grouse population from implementation of mining activities on the tract
- Lands on which impact reduction activities and mitigation would be conducted
- Potential mitigation project types, including success criteria and maintenance requirements
- Options for monitoring sage-grouse use in the Alton–Sink Valley area

References to appropriate sections in the SDEIS are provided for a summary of the existing conditions and impacts resulting from the Proposed Action. Sage-grouse use of the tract is based on the most recently available data.

All off-site mitigation activities would be conducted in the mitigation plan area (see Figures 1 and 3), which includes public, state, and private land, and which corresponds to the sage-grouse analysis area in the Alton Coal LBA EIS. The sage-grouse analysis area corresponds to the boundaries of the Panguitch Sage-Grouse Management Area (SGMA) in the *Conservation Plan for Greater Sage-grouse in Utah* (sage-grouse conservation plan) (UDWR 2013), and the Panguitch Priority Area for Conservation in the *Sage-grouse Conservation Objectives Draft Report* (Sage-grouse Conservation Objectives Team 2012).

Although this mitigation plan is centered on mitigating impacts to sage-grouse, conservation of sagebrush ecosystems would likely also benefit a variety of wildlife species such as Sage Sparrow (*Amphispiza belli*), Brewer's Sparrow (*Spizella breweri*), Sage Thrasher (*Oreoscoptes montanus*), pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), and the UDWR species of concern pygmy rabbit (*Brachylagus idahoensis*) (UDWR 2009). Also, cattle grazing would benefit from an increase in forbs and bunchgrasses; however, cattle would be excluded from the mitigation areas until the vegetation has established successfully. Non-wildlife resources that are analyzed in the SDEIS that would be affected by the sage-grouse mitigation plan include vegetation, livestock grazing, fire management, cultural resources, visual resources, and soils. The impacts that the sage-grouse mitigation plan would have on these resources are discussed in Attachment A of this plan.

## 2.1. Terminology

The terminology used in this plan to describe short- and long-term impacts is consistent with the terminology used throughout the Alton Coal Tract EIS process. That is, *short term* refers to the period when the development of the mine and the mining of coal would occur. *Long term* refers to impacts that occur or remain after the cessation of coal mining and during, or continuing into, the period following the reclamation and monitoring period.

Throughout the document, the term *refugia*, or *refuges*, is used to describe an area of suitable habitat to which sage-grouse individuals can retreat when other habitats have been disturbed. Refugia would be most effective when the refuge locations are currently occupied by sage-grouse. Because sage-grouse are highly mobile, it is expected that they will seek out areas with less disturbance and higher quality habitat when traditional habitat patches are no longer available. If deemed appropriate and necessary, the BLM, in cooperation with USFWS, UDWR, and DOGM, may choose to relocate sage-grouse individuals to refugia. Such relocation would be an example of other management actions that could be considered if birds are not found to be using the refugia areas created.

The term *limited-touch area* is used in this plan to describe no-coal areas within the tract that have intact or restored sagebrush habitats that are required to provide adequate refugia throughout the life of the mine. Surface-disturbing activities in these limited-touch areas are to be avoided if possible. However, these areas can be used to access mining blocks that would otherwise be inaccessible. See Figure 2 for the locations of limited-touch areas.

The mitigation plan area, as shown on Figure 1, not only roughly corresponds to the Panguitch Core Area (Governor's Working Group on Sage-grouse 2012) as described above, but is also UDWR's determination of *occupied sage-grouse habitat*. The tract habitat is designated by UDWR as brood-rearing habitat, but based on site-specific information available to date (i.e., Frey et al. 2013; Frey 2013; Curtis and Frey 2007; Petersen 2007, 2010, 2012, 2013a), it is evident that the species does not use the tract habitat solely for brood-rearing. For the purpose of this document, the habitat polygon defined by UDWR is hereafter referred to as *occupied habitat*.



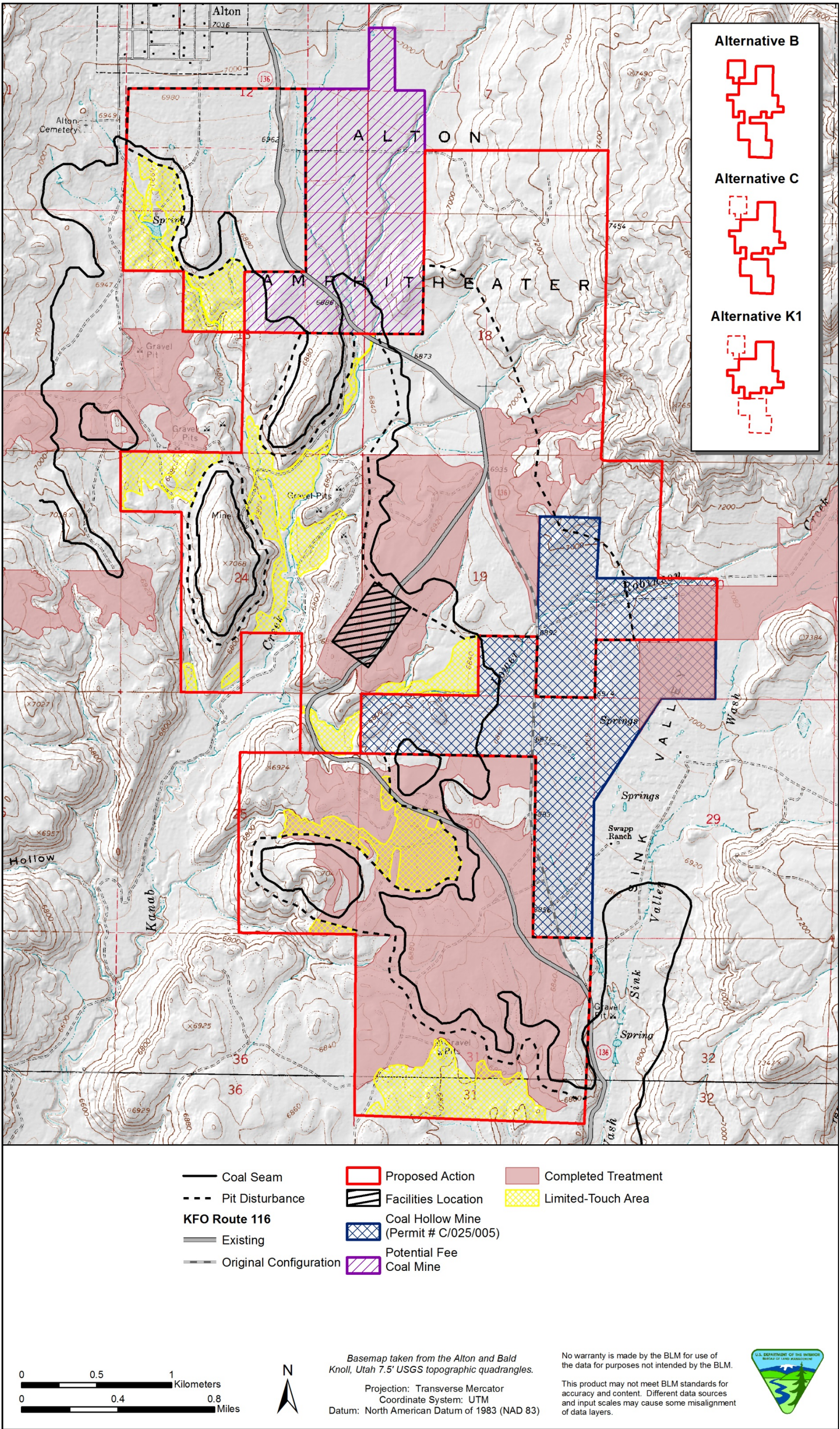


Figure 2. Tract configuration showing limited-touch areas and completed vegetation treatments.



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### 3. GUIDING REGULATION

Many of the public and agency comments received on the DEIS concern impacts to the local sage-grouse population. The SDEIS considers this mitigation plan as a design feature in the analysis of impacts. Mitigation actions are needed in response to public and agency comments on the DEIS, but also as a result of the regulations listed in Section 4.18.2.1.1 of the SDEIS with the following clarifications and additions:

- The Washington Office Instruction Memorandum (IM) 2012-043 identifies the need to “cumulatively maintain or enhance sage-grouse habitat” (BLM 2011b). The Washington Office IM also provides interim conservation policies and procedures to BLM field officials to be applied to ongoing and proposed authorizations and activities that affect the sage-grouse and its habitat. Under this IM, the BLM has the authority to condition the lease with a requirement for off-site mitigation (refer to Washington Office IM 2008-204, Off-Site Mitigation; BLM 2008a). This sage-grouse mitigation plan is intended to address the procedural requirements of this IM with respect to the Alton Coal Tract LBA EIS process. This sage-grouse mitigation plan complies with the IM 2012-043 requirements listed for leasable minerals (energy and non-energy) and fences on preliminary priority habitat. It complies with the requirement to “cumulatively maintain and enhance Greater Sage-grouse habitat” by instituting the following requirements:
  - Habitat avoidance through the designation of limited-touch areas in sagebrush habitats in the tract
  - Enhancing Block Sa (comprising 186.3 acres) and the portions of Block S that have not yet been enhanced prior to the commencement of mining activities
  - Requiring that Blocks S and NW not be mined simultaneously, allowing one to provide a refuge while the other is experiencing disturbances due to mining
  - Reclaiming in-tract sagebrush habitats to vegetation standards that would provide sage-grouse habitat in the long term
  - 4:1 ratio of mitigation acres to disturbance acres to increase available habitat in the analysis area in the short term
- The mitigation plan also complies with BLM IM 2008-204, which allows for off-site mitigation.
- Four decisions in the *Kanab Field Office Record of Decision and Approved Resource Management Plan* (KFO RMP; BLM 2008b) pertain to sage-grouse management (SSS-54, SSS-55, SSS-56, and SSS-57) and detail temporal and spatial buffers for leks and winter habitat within which no surface-disturbing activity may occur. SSS-57 states that an exemption, waiver, or modification may be granted on a case-by-case basis. This sage-grouse mitigation plan is intended to fulfill the requirement for an exception to these RMP decisions that states that the operator must submit a plan that demonstrates that impacts resulting from habitat loss from the Proposed Action can be adequately mitigated.

The BLM initiated a stakeholder process to develop this mitigation plan. The Color Country Adaptive Resource Management Local Working Group (CoCARM)—the local sage-grouse working group— was identified as a representative stakeholder group for initial discussions because it comprises the appropriate agency and government officials with knowledge of the current land uses and quality of habitat in the local area needed to develop an effective and appropriate mitigation plan. This group includes members that represent the UDWR, BLM, U.S. Forest Service (USFS), USFWS, DOGM, affected private landowners, and local public officials. CoCARM met on April 19, June 13 (which was the first meeting attended by USFWS), and August 27, 2012, to initiate discussions about the Alton Coal Tract mitigation planning process.

Outside of the CoCARM meetings, a conference call between BLM, USFWS, and SWCA representatives took place on September 11, 2012, to address the concerns of USFWS. An additional conference call was

held on November 19, 2012, to specifically discuss the mitigation ratio, and was attended by representatives from the BLM, USFWS, Kane County, ACD, UDWR, DOGM, CoCARM, and SWCA. As the applicant for the lease tract, ACD plays an appropriate role in the stakeholder process because they, or the successful bidder for the lease if it is not ACD, would need to implement the mitigation actions.

In Utah, sage-grouse populations are currently managed by UDWR under the sage-grouse conservation plan (UDWR 2013). The sage-grouse conservation plan reflects sage-grouse recommendations that were provided to the Governor of Utah by a multi-disciplinary group of stakeholders in early 2012. The BLM is currently evaluating an amendment to multiple land use plans under which the sage-grouse conservation plan is one of the action alternatives under consideration. See Section 1.7.1.1 of the SDEIS for a more detailed description of this process. Pursuant to Section 7.3.2 of the sage-grouse conservation plan, the BLM may continue the pending evaluation of the Alton LBA without recourse to the provisions of the plan.

Given the dynamic nature of the current regulatory environment for sage-grouse, the BLM expects that there may continue to be changes in sage-grouse policies and guidance between completion of the mitigation plan and final implementation of mitigation actions. The BLM will consider new information as it becomes available and revise the mitigation plan if appropriate.

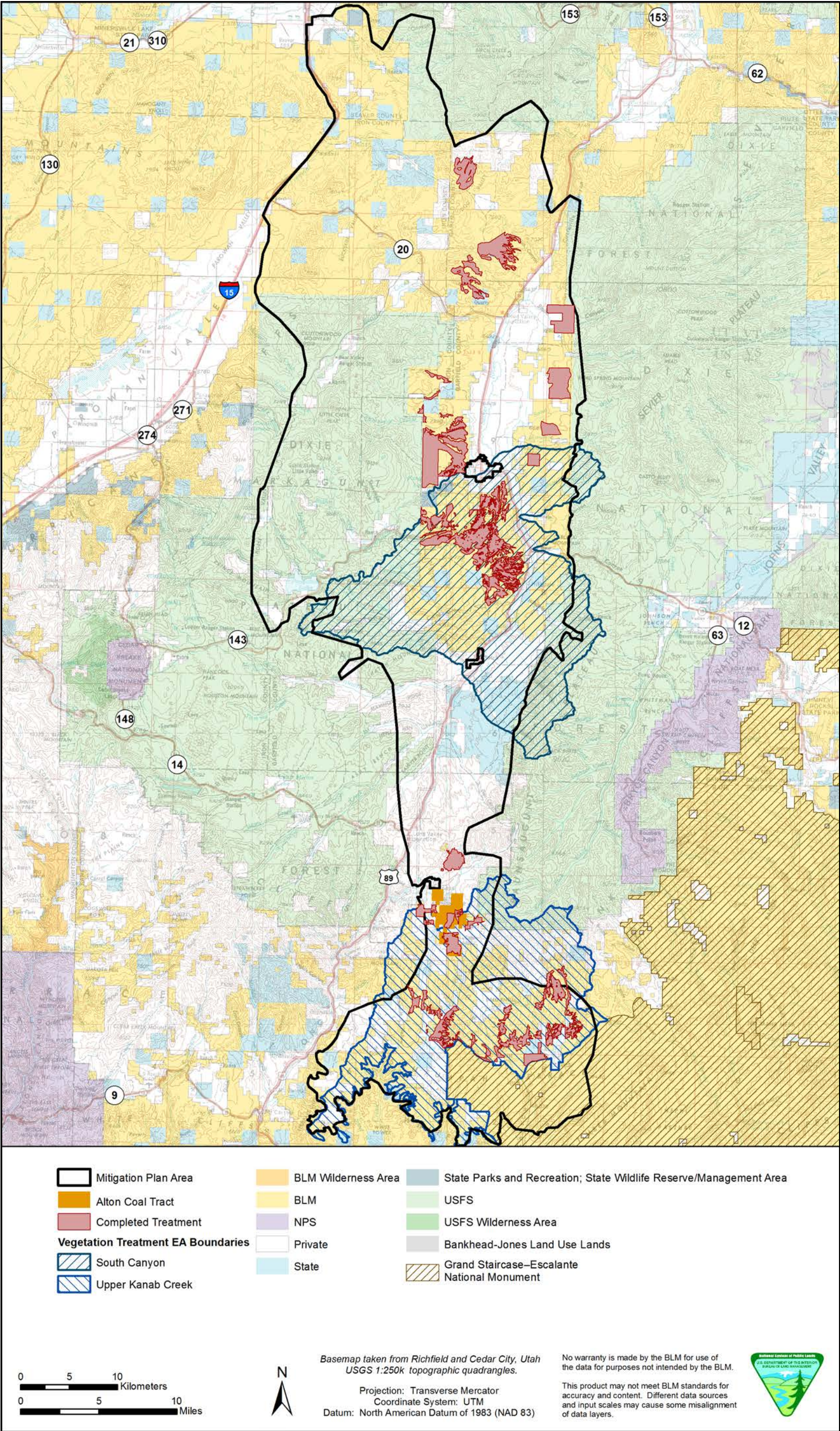
### **3.1. Compliance with the National Environmental Policy Act**

The mitigation actions described in this document will be incorporated into the Alton Coal Tract SDEIS as required design features. To maintain compliance with the National Environmental Policy Act (NEPA), the successful lessee must follow the mitigation practices set forth by this plan.

Mitigation projects would be fully compliant with NEPA by the completion of site-specific analyses on all projects prior to any mitigation-related disturbance. Site-specific documents would tier off the Alton Coal Tract LBA EIS to the extent possible. Site-specific analyses would address impacts on other resources and areas from individual mitigation projects. Separating the site-specific documentation for mitigation actions from the Alton Coal Tract LBA EIS is necessary to maintain the flexibility of choosing appropriate mitigation areas after the tract is leased and nearer to the timeframe when mining would begin. It is not appropriate to select specific mitigation projects and specific mitigation areas at this time given the currently shifting nature of sage-grouse management policies and guidelines as described above. If the BLM decides in its ROD to offer the Alton Coal Tract for competitive leasing following completion of the EIS process, the successful bidder would need to complete several other permitting steps (e.g., compliance with the Surface Mining Control and Reclamation Act of 1977) before conducting mining activities on the tract. These permitting steps typically involve detailed field studies and months to years to complete.

Site-specific NEPA analyses have already been completed for vegetation treatment projects near the tract in Kane and Garfield counties. The vegetation treatments conducted as mitigation measures for the tract would likely be similar to those analyzed in the *Upper Kanab Creek Watershed Vegetation Management Project Environmental Assessment* (BLM 2011c) and the *South Canyon Vegetation Enhancement Environmental Assessment* (BLM 2010). Both of these projects involve removal of pinyon-juniper that has in-filled and encroached into all other vegetation types, including ponderosa pine areas, sagebrush/grasslands, and mountain brush communities. The purpose of these projects is to create diverse, healthy age classes of sagebrush, with an understory of desired grasses and forbs. Such sagebrush communities provide quality habitat necessary to maintain sustainable populations of sage-grouse, mule deer, and sagebrush-obligate species. Many of these projects have been completed and are currently used by grouse, as shown in Figure 2 and Figure 3 and as described in Section 3.18.3.4.2 of the SDEIS.





**Figure 3.** Greater sage-grouse mitigation plan area, completed vegetation treatments, and vegetation treatment environmental assessment boundaries in relation to the Alton Coal Tract.



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However, due to inadequate funding, all potential vegetation treatment projects in these areas would likely be completed over the course of decades. With funding from the selected lessee, projects in these areas could be conducted within a short timeframe and make a large amount of habitat available to local sage-grouse within the timeframe of the life of the mine (which varies under each alternative). Areas covered by these environmental assessments could undergo vegetation treatments immediately, without having to delay the mitigation process for additional analysis and/or permitting.

## 4. GOALS

The goals of this mitigation plan are as follows:

- Offset habitat impacts of mining the tract, as identified through the EIS process, by implementing habitat management and vegetation treatment projects in the mitigation plan area.
- Identify mitigation opportunities that reduce or remove threats under the five listing factors used by the USFWS to assess the status of ESA-listed and candidate species. A detailed discussion of these factors can be found in *Endangered and Threatened Wildlife and Plants; 12-month Findings for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered; Proposed Rule* (50 CFR 17, *Federal Register* 75:13910–14014).

These factors are as follows:

- The presence of threatened destruction, modification, or curtailment of habitat or range, including urbanization, energy development, mining, fences, fire, invasive plants, pinyon-juniper encroachment, climate change, and habitat fragmentation
- Overuse for commercial, recreational, scientific, or educational purposes, including hunting, bird watching, Native American religious use, and scientific studies
- Disease and predation, including the potential for West Nile virus outbreaks, and increased predation
- Inadequacy of existing regulatory mechanisms at the local, state, federal, and international levels<sup>1</sup>
- Other natural or human-made factors affecting the species' continued existence, including pesticides, contaminants, recreational activities, life history traits that may affect viability, and drought.

The key threats to sage-grouse in the mitigation plan area are increased predator populations, vegetation management (conflicting uses or lack of management), energy development, conifer encroachment, and residential/commercial development (Frey et al. 2006; USFWS 2013), as described in Section 5 of this document.

- Establish potential mitigation project types and locations based on the availability of existing site-specific sage-grouse population information (e.g., lek counts) and ecological condition information (e.g., habitat location and size, opportunity locations, completed vegetation treatment locations). This site-specific information includes data gathered for the adjacent Coal Hollow Mine, which has been in operation since 2010. Monitoring data regarding sage-grouse population and activity have been gathered, and continue to be gathered, in association with this mine. The existing site-specific population information may not be conclusive, but it can be used to help inform project planning.

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<sup>1</sup> The findings were published on March 5, 2010. Since that time, regulatory mechanisms have been created to address threats to Greater Sage-Grouse, such as the sage-grouse conservation plan (UDWR 2013); a resolution passed by Kane County, Utah, on April 22, 2013, with the goal to protect, maintain, improve, and enhance Greater Sage-Grouse habitat in Kane County; and BLM's IM No. 2012-043, which was published on December 22, 2011, and ensures that interim conservation policies and procedures are implemented when field offices authorize or carry out activities on public land while the BLM develops and decides how to best incorporate long-term conservation measures for Greater Sage-Grouse into applicable land use plans.

- Ensure the short- and long-term persistence of
  - the current southern-most population of Greater Sage-Grouse across the range of the species, and
  - suitable habitat to support that population.

The mitigation plan area corresponds to the boundaries defined for the sage-grouse analysis area, as described in Section 3.18.3.4 of the SDEIS. The key threats to sage-grouse in the mitigation plan area are increased predator populations, vegetation management (conflicting uses or lack of management), energy development, conifer encroachment, and residential/commercial development (Frey et al. 2006; USFWS 2013).

## **5. THREATS TO GREATER SAGE-GROUSE**

Rangewide, sage-grouse numbers have declined, and they now occupy approximately 56% of their historic range, though the actual decline in sage-grouse numbers since pre-settlement times is unclear because estimates were largely anecdotal before the implementation of systematic surveys in the 1950s (USFWS 2013). In general, population declines are primarily due to the following:

- Habitat loss
- Habitat fragmentation
- Reduced habitat quality from urban expansion
- Habitat loss and fragmentation associated with energy development
- Conversion of habitats to agriculture
- Alteration of habitats by invasive species that reduce habitat quality by reducing herbaceous forage and/or by increasing the frequency and intensity of ground fires (Bosworth 2003; UDWR 2002; UDWR 2005).

The CoCARM local working group identified concentrated wildlife and/or livestock use as another threat in the mitigation plan area due to the high levels of both wildlife and livestock grazing in the mitigation plan area, the contentiousness of the issue, and because the exact extent of these impacts (both negative and beneficial) is not known (Frey et al. 2006). Additionally, conifer encroachment has played a large role in decreasing available sagebrush habitat in the mitigation plan area.

Mining activities on the tract would contribute to sage-grouse habitat loss, habitat fragmentation, and alteration of habitats by invasive species. The species' sagebrush steppe habitats and associated herbaceous understory have already been reduced by improper grazing, invasive plant species, altered fire regimes, pinyon-juniper encroachment, and oil and gas industry expansion (UDWR 2005). Pinyon-juniper woodland encroachment into sagebrush habitats has reduced the quality and quantity of sagebrush stands and contributed to a rangewide decline in sage-grouse abundance (Connelly et al. 2004)—a threat that is locally evident. High predation rates from non-native predators or un-naturally high native predator populations are another specific threat to sage-grouse in this area (Connelly et al. 2004; UDWR 2005). The Alton sage-grouse population has experienced high mortality from predation, with a relatively large number of sage-grouse known to have been killed by predators since 2005 (Curtis and Frey 2007). Increasing predation by non-native predators (domestic pets, red foxes, raccoons) and native ravens is of concern (Frey et al. 2006). In Utah, sage-grouse are present in scattered populations north and west of the Colorado River (UDWR 2002) on approximately 40% of their historic range (Beck et al. 2003).

## **6. SUMMARY OF FEDERAL ACTION UNDER CONSIDERATION**

A detailed description of alternatives can be found in Chapter 2 of the DEIS (BLM 2011a) and the SDEIS (BLM 2014).

### **6.1. Design Features Incorporated into the Federal Action**

The on-tract reclamation, pre-mining vegetation treatment, and mitigation (avoidance) measures incorporated into the federal action are detailed in Section 4.18.2.1.2.1 of the SDEIS.

Note that under Alternative K1, which is analyzed in detail in the SDEIS, Blocks S and NW are excluded from the tract, and therefore these avoidance-based mitigation conditions would not apply under this alternative (though these areas would be available for off-site mitigation actions as appropriate). Likewise, under Alternative C (analyzed in detail in the DEIS and the SDEIS), Block NW is excluded from the tract, and therefore, certain avoidance-based mitigation actions would not apply under this alternative.

## **7. GREATER SAGE-GROUSE USE OF MITIGATION PLAN AREA AND TRACT**

Greater Sage-Grouse use of the mitigation plan area (analysis area) and tract is described in Section 3.18.3 of the SDEIS. Detailed information can be found in the following sections of the SDEIS:

- 3.18.3.1 Regulatory Status
- 3.18.3.2 General Habitat Needs
- 3.18.3.3 Distribution and Threats
- 3.18.3.4 Analysis Area Description (corresponds to mitigation plan area)
  - 3.18.3.4.1 Connectivity and Movement between Leks
  - 3.18.3.4.2 Completed Analysis Area (mitigation plan area) Vegetation Treatments
  - 3.18.3.4.3 Coal Hollow Mining Operation
- 3.18.3.5 Sage-grouse Use of the Tract
  - 3.18.3.5.1 Lek Description
  - 3.18.3.5.2 Counts and Estimate
  - 3.18.3.5.3 Tract and Transportation Route Habitat
    - 3.18.3.5.3.1 Breeding, Nesting, and Brood-rearing Habitat in the Tract
    - 3.18.3.5.3.2 Wintering Habitat in the Tract
    - 3.18.3.5.3.3 Transportation Route Habitat

Figure 4 displays the occupied sage-grouse habitat according to UDWR and the existing vegetation communities that comprise sage-grouse habitat in the tract.

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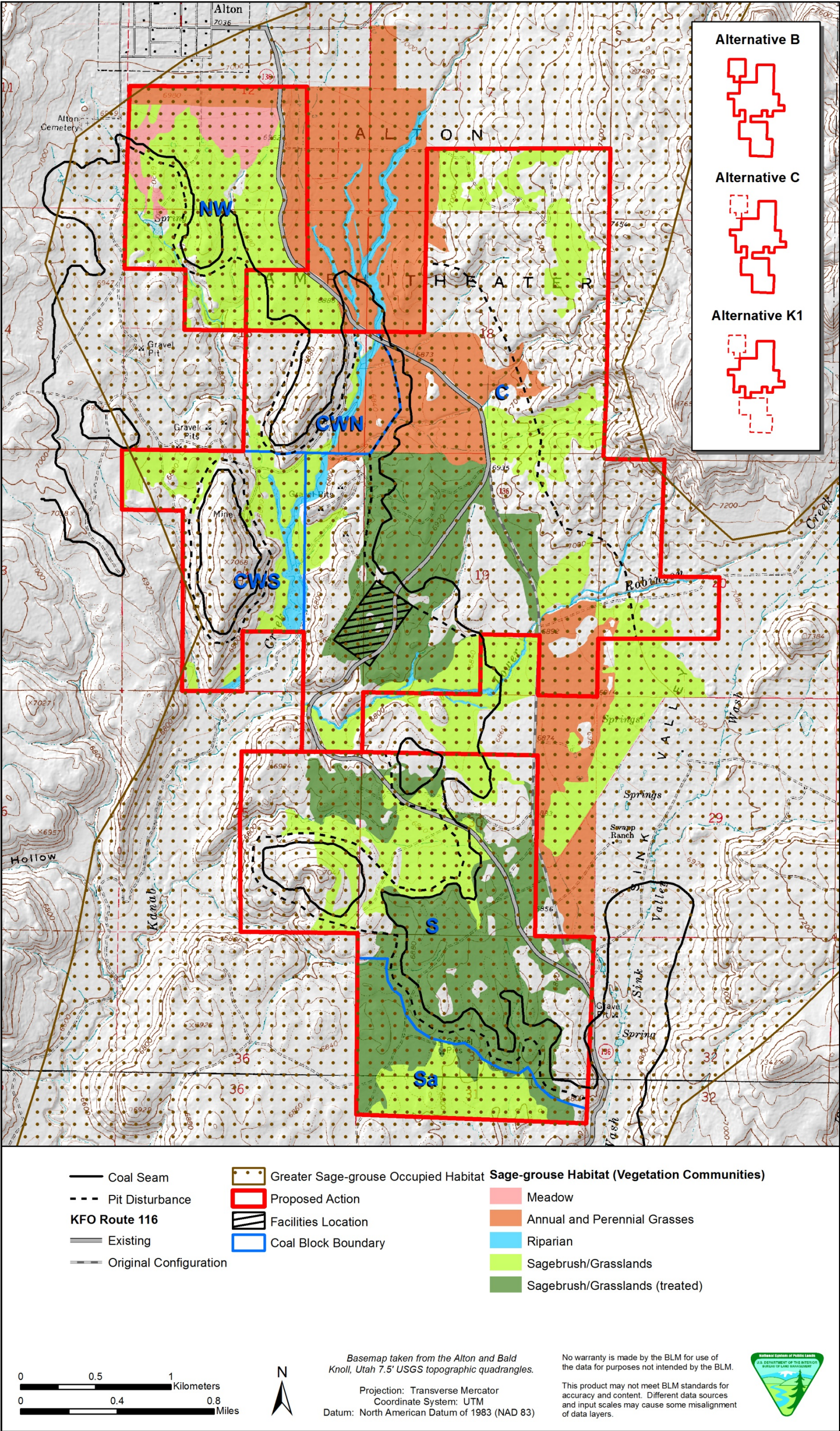


Figure 4. Sage-grouse occupied habitat and vegetation communities on the Alton Coal Tract.



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## 8. IMPACTS TO GREATER SAGE-GROUSE

Impacts to Greater Sage-Grouse from each alternative is described in Section 4.18.2 of the SDEIS. Detailed impacts analyses can be found in the following sections in the SDEIS:

- 4.18.2.2 Impact Indicators
- 4.18.2.3 Analysis Assumptions
- 4.18.2.4 Impacts Resulting from Mining the Tract
  - 4.18.2.4.1 Alternative A: No Action
  - 4.18.2.4.2 Alternative B: Proposed Action
    - 4.18.2.4.2.1 Habitat Loss and Displacement
    - 4.18.2.4.2.2 Infrastructure Impacts, Including Roads
    - 4.18.2.4.2.3 Noise and Nighttime Lighting Impacts
  - 4.18.2.4.3 Alternative C: Reduced Tract Acreage and Seasonal Restrictions
  - 4.18.2.4.4 Alternative K1: Reduced Tract Acreage
- 4.18.2.5.1 Impacts Resulting from Coal Hauling
  - 4.18.2.5.2 Alternative A: No Action
  - 4.18.2.5.2 Alternative B (Proposed Action), Alternative D (Reduced Tract Acreage and Seasonal Restrictions, and Alternative K1 (Reduced Tract Acreage)

## 9. PROPOSED MITIGATION PLAN LANDS

As introduced in Section 2 (Purpose), all mitigation actions would be conducted in appropriate habitat in the mitigation plan area (Figure 3). This area is also roughly the Panguitch Core Area in the *Utah Greater Sage-grouse Management Plan* (UDWR 2013), the impacts analysis area for sage-grouse in the SDEIS, and occupied habitat as defined by UDWR (UDWR 2012). The purpose of determining a mitigation plan area is to ensure that mitigation 1) is accomplished in the same area as potential impacts from leasing and mining the Alton Coal Tract and 2) would benefit the impacted sage-grouse population. Mitigation would occur both on and off the tract and could occur on state, federal, and/or private lands, with permission from the owner or manager of the lands where specific mitigation actions would take place.

Many options for habitat improvement projects exist in the tract and the mitigation plan area. Off-tract vegetation treatments to fulfill mitigation requirements would be prioritized in those areas analyzed in the BLM's *South Canyon Vegetation Enhancement Project Environmental Assessment* and *Upper Kanab Creek Watershed Improvement Project Environmental Assessment* (BLM 2010, 2011c).

Areas analyzed in these environmental assessments consist of places where conifer removal could be done from areas with an intact sagebrush understory immediately adjacent to habitat occupied by sage-grouse.

Prioritizing these areas would increase the potential for off-tract vegetation treatments to be successful and useful to the impacted sage-grouse because 1) these areas exhibit classic characteristics of habitat that, when treated, would quickly increase available sage-grouse habitat (Baruch-Mordo et al. 2013; Commons et al. 1999; Frey et al. 2013); and 2) the Panguitch sage-grouse population has been documented to quickly use habitat after juniper elimination, especially in areas adjacent to occupied

habitat, indicating intact sagebrush habitat is limited in the area (Frey et al. 2014). Prioritizing vegetation treatments in these areas would increase the potential for mitigation to benefit local sage-grouse in the short term. However, the best available and most site-specific information would be taken into consideration when choosing exact mitigation project locations to provide the maximum benefit to the impacted birds.

Several habitat improvement projects are already planned for the tract, but have not yet been completed. Several large vegetation treatments have occurred near the tract recently, such as those associated with the Upper Kanab Creek and South Canyon Vegetation Enhancement projects; activities to expedite the recovery of sagebrush into these habitats may benefit sage-grouse. Throughout the area most heavily used by the sage-grouse population, there are extensive stands of pinyon-juniper. Activities to reduce the spatial extent of these stands, especially along the interface between forested and sagebrush-dominated habitats, may benefit sage-grouse. Many areas, especially in habitats that have experienced fire relatively recently, are dominated by invasive annual grasses (e.g., cheatgrass), and a holistic approach to managing the spread and extent of these species may be critical for the long-term maintenance of sagebrush-dominated habitats vital to the sage-grouse population. There are also many locations with potential to enhance grass and forb availability as well as to control for common sage-grouse predators. Some locations for potential projects as well as previously treated areas are presented on Figure 5.

The success of these vegetation treatments would be determined through monitoring conducted by BLM personnel or contractors. Success would not be tied to a requirement that sage-grouse must use the treated habitat; reasons for such are detailed in Section 11.2 below (Success Criteria). Monitoring would consist of nested frequency or other BLM monitoring techniques and photo points. There would be regular monitoring (sage-grouse counts), with annual monitoring of actual use, and trend monitoring every three to five years as staffing and funding permit.



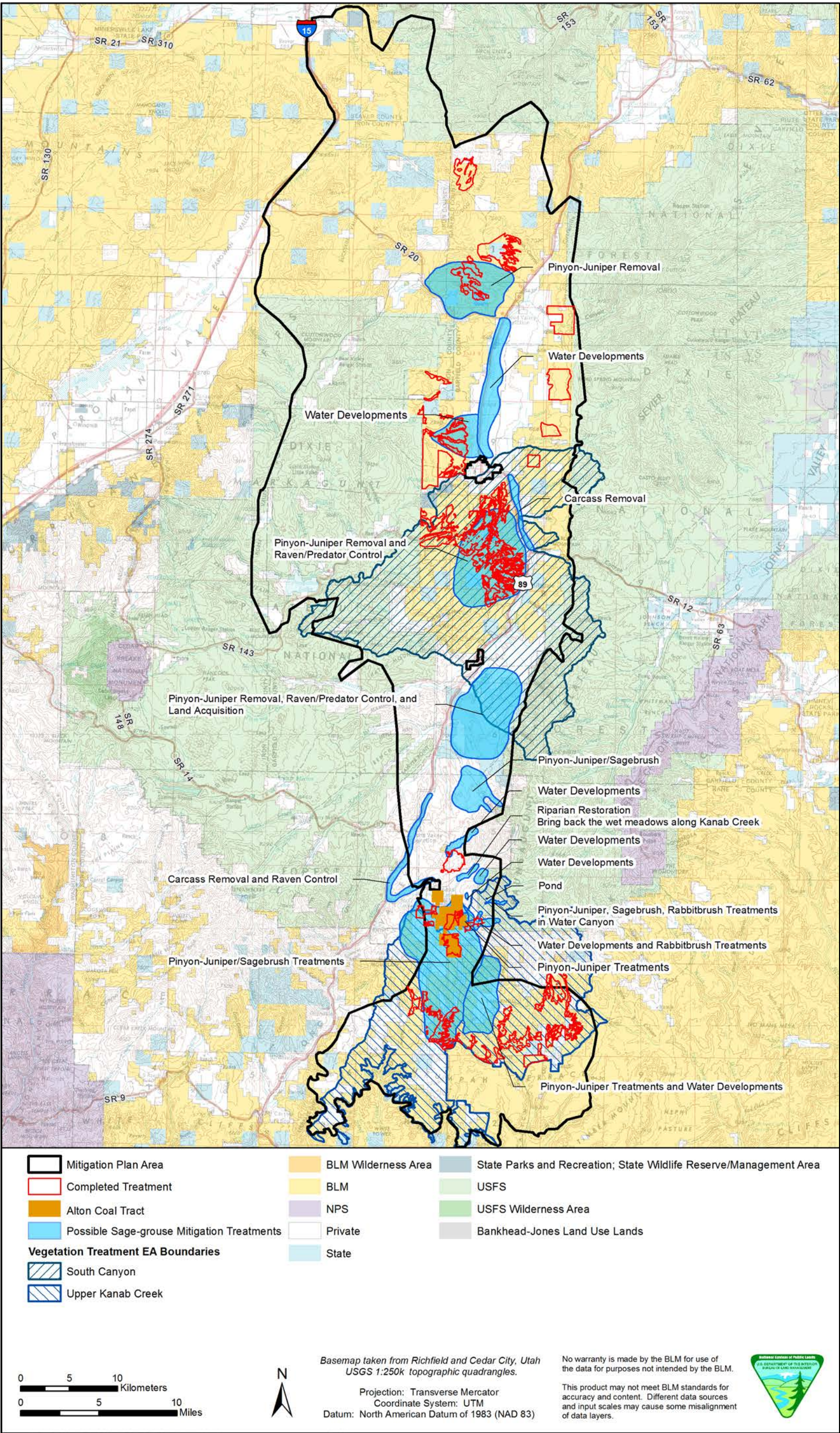


Figure 5. Possible sage-grouse mitigation treatments and previously treated areas in and near the Alton Coal Tract.



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Acres inside the potential mitigation areas (except those identified for carcass removal, raven control, and water developments and excluding the tract under Alternative B) that have not previously been treated are reported in Table 1 as areas that are available for treatment. These areas occur on lands owned/managed by the BLM, USFS, state, and private entities. Additional acres would be available for treatment under Alternatives C and K1 because the tract size would be decreased, and areas directly adjacent to the tract would not be mined at this time. The acreage that has been previously treated consists of the following types of treatments overseen by BLM: aerator/harrow/seed, bull hog, bull hog/seed, burn, crush, lop and scatter, mastication/mow, plow, seed, and thin. Note that the acres available for treatment reported in Table 1 may not all currently be habitat or locations appropriate for vegetation treatment. The acreage displayed in Table 1 is reported to provide context of how much of the mitigation plan area has been treated and whether the mitigation ratio proposed in this plan is feasible.

**Table 1.** Areas Identified as Having a High Potential for Mitigation, Areas Previously Treated (through 2013), and Total Acreage of Areas Available for Treatment, by Land Ownership

	Potential Mitigation Areas (acres)	Previously Treated (acres)	Available for Treatment (acres)
BLM	104,538	26,996	77,542
USFS	23,721	2	23,719
State (Utah Department of Natural Resources and School and Institutional Trust Lands Administration)	19,346	1,300	18,046
Private	55,163	1,576	53,578
<b>Total</b>	<b>202,768</b>	<b>29,874</b>	<b>172,885</b>

\* Data from BLM (2013).

## 10. COMPENSATORY MITIGATION PLANNING PROCESS

Under this plan, the avoidance actions listed in Section 4.18.2.1.2 (Design Features) of the SDEIS would be required throughout the life of the mine. The following mitigation planning process applies to compensatory (off-site mitigation) actions, which would be evaluated and implemented continually.

Wildlife populations, management objectives, and the factors affecting them are very dynamic. It is therefore impractical to identify specific compensatory mitigation locations, in advance, for the life of mining activities on the tract. Furthermore, deciding on exact mitigation project locations is not an appropriate action for this phase of the planning process. Exact locations, scopes, and other relevant details of mitigation projects would be chosen at the permitting phase, when more detail is known regarding mining sequences and annual disturbance amounts. This adaptive management component allows decisions to remain flexible as changes occur to the environment, as positive or negative impacts are identified to sage-grouse and habitats, and as relevant studies are published.

The BLM and DOGM (in consultation with UDWR and USFWS) would lead compensatory mitigation planning for the life of the mine to ensure interagency cooperation and coordination of mitigation actions and to ensure compliance with the mitigation plan. The scope of mitigation actions (locations, areas, and nature of vegetation treatments) would be developed based on biological considerations, and agreed to by the BLM, DOGM, and the successful lessee. Other entities that would be kept informed of the intentions and progress of the mitigation projects are local governments, CoCARM, and affected

private landowners where development or mitigation is proposed to occur. Projects would conform to the governing land use plan of the KFO and/or other managers/owners as applicable. Projects would also be consistent with the sage-grouse conservation plan (UDWR 2013), the purpose of which is to provide for the management of sage-grouse in Utah consistent with Utah Code Title 23, which declares wildlife as the property of the state, and with the UDWR goals of expanding wildlife populations and conserving sensitive species. The successful lessee would be responsible for carrying out the approved mitigation, as applicable, and working with the BLM, UDWR, DOGM, and the land manager or owner in implementing appropriate activities. The lessee could either carry out the mitigation using company resources, or provide funding to other entities that would then complete the mitigation actions. The selected lessee would be responsible to fund all aspects of the mitigation projects, including the required NEPA documentation and monitoring.

In addition to supporting development of this plan, BLM and DOGM would have five future plan implementation responsibilities. During the leasing process, BLM would be the lead agency implementing these responsibilities. During project implementation DOGM would become the lead agency implementing these responsibilities. The five future plan implementation responsibilities are as follows:

- Provide guidance to the successful lessee on minimizing, to the extent practicable, impacts associated with planned future mining activities on the tract and complying with lease stipulations.
- Provide potential project types and locations for consideration by the BLM, other entities as applicable, and selected lessee for habitat improvement projects.
- Conduct site-specific NEPA analysis once specific mitigation locations and actions have been chosen.
- Determine when a project is successfully completed and ensure that success is maintained for the specified time period.
- Enforce the mitigation requirements of the mitigation plan as design features, including the requirement that year-round, suitable habitats are continuously available to provide refugia for the sage-grouse population while removal and restoration of other habitat areas are taking place.

Mitigation projects would begin as soon as practicable, which could be before mining activities begin, and would be ongoing throughout the life of the mine until the total mitigation obligation is satisfied. The BLM desires that as many mitigation requirements are completed as early as possible so sage-grouse can benefit from the mitigation actions during mining activities. In this way, the lessee could mitigate for direct impacts before they have occurred. In subsequent years of development, an annual review of the development activities would be conducted, and an annual summary of project activities would be provided. Annual review meetings would be held with representatives from the lessee, BLM, DOGM, UDWR, and USFWS to discuss the success of completed mitigation and for outstanding requirements for mitigation projects to be conducted in the future.<sup>2</sup>

## **10.1.Mitigation Requirements**

This section sets forth mitigation requirements to be carried out by the successful bidder. These requirements were designed to compensate for direct and indirect impacts (as described in Section 4.18.2 of the SDEIS) that may occur to local sage-grouse groups from mining the tract. Habitat impacted would be mitigated for with improvements to like habitat when possible, but such decisions are more

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<sup>2</sup> The Office of Surface Mining Reclamation and Enforcement also has an oversight role over DOGM's regulation of coal mining within the state, under the Surface Mining Reclamation and Control Act (30 United States Code 1201 et seq).

appropriately made at the implementation stage through site-specific NEPA analyses. The following would be required as design features for the lessee:

- Vegetation treatments (as well as mesic and riparian habitat enhancement projects) at a ratio of 4:1 per acre of directly surface-disturbed sage-grouse habitat. Research pertaining to and concurrent with the vegetation treatments (e.g., monitoring bird habitat use, sagebrush canopy measurements) is necessary to ensure appropriate and successful treatments. Off-site vegetation treatments would be completed no more than one year after the corresponding on-tract surface disturbance occurs. The exact timing of mitigation projects would be determined at the permitting stage when more detailed knowledge of the mining sequence and level of disturbance is known.
- As a preventative measure, the removal of all fences that occur within 2 miles of the Alton–Sink Valley lek, where practicable.
- Because coal trucks comprise approximately 4% of the traffic on nearby roads, the proponent would be responsible for funding up to 4% of the Utah Department of Transportation’s roadkill carcass removal on the coal transportation haul route in coordination with Utah Department of Transportation, DOGM, UDWR, and BLM. Enforcement would be based on a cooperative agreement between these entities.
- A nearby mine approximately half the size of the tract has contracted with U.S. Department of Agriculture (USDA) Wildlife Services to spend approximately \$6,000 every five years for local predator control. Under this lease agreement, the selected lessee would provide \$12,000<sup>3</sup> every five years to USDA Wildlife Services to fund predator control actions in the mitigation plan area, focusing on corvid species, red fox, and other potential predators.

Assigning ratios to acres of direct impacts to offset project impacts is a common approach used for determining appropriate levels of mitigation, with the understanding that sufficient data must exist to adequately compare the value of ecological services between habitat lost and habitat replaced. Mitigation ratios are applicable to acres of habitat directly impacted, and they are implemented to ensure that indirect impacts to sage-grouse (such as noise, fragmentation, habitat avoidance, and the time-lag before reclamation actions are successful) are appropriately compensated for. A 4:1 ratio was chosen for this project for the following reasons:

1. It is the ratio currently used for mitigation requirements by DOGM for the Coal Hollow permit.
2. It is the ratio that is recommended for mitigation in nesting areas by the sage-grouse conservation plan (UDWR 2013).
3. It is the lowest ratio that would be acceptable according to USFWS.
4. Required reclamation of surface disturbance would take place on the tract in such a way as to create sage-grouse habitat in the long term by decreasing current levels of conifer encroachment. Though reclamation is not considered to be mitigation for the purposes of this plan, reclamation would ultimately benefit sage-grouse.
5. Other actions as described above (e.g., fence marking) would be implemented to mitigate for impacts to sage-grouse in addition to the vegetation treatments to which the 4:1 ratio applies.

It is expected that completion of required mitigation (both vegetation treatments and other actions) in cooperation with other design features (as defined in Section 4.18.2.1.2 of the SDEIS) would produce no net loss of sage-grouse habitat in the short term, and a net benefit to local sage-grouse populations in the

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<sup>3</sup> This amount is based on a doubling of the amount that ACD has contracted with USDA Wildlife Services to spend on predator control from 2011 to 2016 as partial mitigation fulfillment for the Coal Hollow permit (see Appendix B of Appendix 3-5 of the *Alton Coal Development Coal Hollow Project Mining and Reclamation Plan* [ACD 2009]).

long term, even with the presence of the coal mining project. This assumption is based in part on documentation of sage-grouse using treated areas immediately after treatment takes place (as described in Section 3.18.3.4.2 of the SDEIS).

UDWR identifies 3,550.8 acres of the tract (99% of the tract and 2.5% of the mitigation plan area) as occupied habitat. This habitat boundary does not represent a survey-grade boundary and is not intended to be the final authority for habitat delineation. The BLM and DOGM would consult with UDWR to determine precise delineation of habitat (as well as exclusion of non-habitat) to determine the exact amount of required mitigation. The exact amount of required mitigation would be determined when the mitigation plan (this document) is finalized by using the most recent and accurate site-specific information, including but not limited to Frey et al. 2013; Frey 2013; Curtis and Frey 2008; Petersen 2007, 2010, 2012, 2013a; and the December 10, 2013 assessment by Dr. Steven Petersen. Table 2 presents the upper limit of required acres of vegetation treatments by alternative using a 4:1 mitigation ratio.

**Table 2.** Required Acres of Mitigation Vegetation Treatments Based on 4:1 Mitigation Ratio Requirement by Alternative

	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C	Alternative K1
Occupied habitat	0	7,258.0	6,051.6	3,656.4

Note: Data from this table area based on acres of direct disturbance by alternative, as displayed in Table 1.

As indicated above, reclamation of disturbed lands is considered an action separate from mitigation. Reclamation would be accomplished as a separate permit requirement. However, the mitigative effect of reclamation was taken into consideration when determining the 4:1 mitigation ratio.

## 11. COMPENSATORY MITIGATION PROJECTS

Habitat improvement actions would target improvements to sage-grouse habitat availability by increasing the spatial extent of available habitats by either creating suitable habitats (restoring burned areas, removing pinyon-juniper in sagebrush-dominated habitats, etc.) or by protecting existing habitats (e.g., reducing threats caused by the spread of invasive annual grasses). Actions to improve habitat quality would focus on management activities that target the herbaceous understory (increasing grass height and cover for nesting females, increasing forb cover and insect density for brooding females, etc.) while maintaining the shrub overstory (Connelly et al. 2000). Treatment for mitigation credit would not apply to areas disturbed by mining activities on the tract (which would be reclaimed consistent with the approved mining plan and design features), but would apply in other pre-existing areas of disturbance and otherwise low-quality habitat. A weed management plan would be drafted and followed for each mitigation project to maintain the desired results of the treatment. Habitat improvement projects could take place on any lands within the mitigation plan area, pending approval of the land surface management agency or owner (in the case of private lands). Treatments conducted as mitigation for the Coal Hollow Mine would not accrue mitigation credit for disturbance associated with the BLM lease.

To effectively manage sage-grouse populations in a proactive manner, habitat improvements must meet two basic requirements:

- Habitat manipulations need to occur in areas where habitat deficiencies exist.
- The type of manipulation needs to result in habitats that are enhanced for the season of interest.



To meet these requirements, off-tract vegetation treatments would be prioritized in areas where conifer removal could be done from areas with an intact sagebrush understory immediately adjacent to habitat occupied by sage-grouse, including those areas analyzed in the BLM's *South Canyon Vegetation Enhancement Project Environmental Assessment* and *Upper Kanab Creek Watershed Improvement Project Environmental Assessment* (BLM 2010, 2011c). Management planning in these areas revolves around the idea that to enhance sage-grouse populations within a given landscape, the carrying capacity of that landscape needs to be increased.

Success of the on- and off-tract vegetation treatments would not be dependent on whether sage-grouse are documented using the treated habitat; reasons for this are listed in Section 11.2 of this document (Success Criteria).

Several documents outline the steps necessary to implement a successful habitat management program for sagebrush habitats. The Wyoming Game and Fish Department (2011) outlines evaluation criteria that should be considered when proposing vegetation treatments in sagebrush-dominated habitats. Bohne et al. (2007) expand on this list of criteria with sage-grouse-specific recommendations. The criteria described by Bohne et al. include the following:

- Determine if sage-grouse (or other species of interest) seasonal habitats are present, the condition of these habitats, and the relative level of importance of these habitats. In the case of sage-grouse, it is important to know whether the population is resident or migratory when evaluating potential habitats affected by proposed actions.
- Identify how much of the sage-grouse habitat in the area has been previously impacted by fire (prescribed or wild), other habitat conversions, habitat losses, or fragmentation, preferably using a geographic information system-based analysis.
- Determine how much of the area is likely to burn in future wildfire and at what scale (a risk assessment).
- Identify the short-term (1–14 years) effects and the mid-term effects (15–30 years) of prescribed fires or other treatments on vegetation and key wildlife species.
- Assess the presence of undesirable plant species (e.g., cheatgrass, invasive noxious weeds, rabbitbrush, juniper, and other conifer invasion) and the risk of these species increasing under current management and/or as a result of the proposed treatment.
- Determine the likely response of desirable species of vegetation that are present to the type and intensity of treatment being proposed.
- Provide a clear statement of the intended objectives of the prescribed treatment, provide a rationale for the treatment, and identify impacts to sage-grouse and other species of interest as part of the management prescription and environmental assessment.
- Establish overall goals along with measurable objectives and an adequate monitoring plan (adequate in terms of funding as well as quantifying the effects of treatment).
- Identify mitigation measures (if any) needed to offset potential adverse impacts on sage-grouse habitat.
- Develop a post-treatment management plan that ensures desired vegetative responses can be achieved and maintained.

## 11.1.Mitigation Project Types

Five mitigation project types are discussed in detail below: 1) vegetation treatments (including juniper removal, sagebrush restoration, and forb/bunchgrass seeding), 2) increasing natural mesic areas, 3) predator management, 4) fence marking/removal, and 5) other. Conservation easements on private land are another type of mitigation project that can protect sage-grouse habitat. However, they will not be adopted as a requirement because there is no way to enforce such easements on private land. Habitat

treatments on BLM-administered land can be assured protection through conditions requiring avoidance and avoidance through site-specific NEPA analyses. The planning process also provides a means to protect habitat in the long term.

### **11.1.1. Vegetation Treatment**

As stated above, off-tract vegetation treatments would be prioritized in areas where conifer removal could be done from areas with an intact sagebrush understory immediately adjacent to habitat occupied by sage-grouse, such as those areas analyzed in the BLM's *South Canyon Vegetation Enhancement Project Environmental Assessment and Upper Kanab Creek Watershed Improvement Project Environmental Assessment* (BLM 2010, 2011c). However, a range of project types is listed below to provide flexibility to meet the current needs of the population, as assessed by BLM and DOGM at the time of project planning and initiation.

#### **11.1.1.1. JUNIPER REMOVAL**

Fire suppression and other post-settlement conditions have allowed juniper (*Juniperus* spp.) trees to spread into areas previously dominated by grasses, forbs, and shrubs. Miller et al. (2005) report that many areas in the west have experienced an estimated 10-fold increase in juniper over the last 130 years. The expansion of juniper and other conifer species reduces habitat for sage-grouse and other sagebrush-obligate species that depend on large patches of sagebrush-dominated vegetation. Sagebrush cover decreases with juniper encroachment as the vegetation transitions into woodland.

Most juniper communities are still in a state of transition. Miller et al. (2005) characterize three stages of woodland succession:

- Phase I (early): Trees are present, but shrubs and forbs are the dominant vegetation that influences ecological processes (hydrologic, nutrient, and energy cycles) on the site.
- Phase II (mid): Trees are co-dominant with shrubs and herbs, and all three vegetation layers influence ecological processes on the site.
- Phase III (late): Trees are the dominant vegetation and the primary plant layer influencing ecological processes on the site.

Sites in Phase I or II successional stages often retain a significant understory of sagebrush (i.e., grasses and forbs); as such, removal of Phase I or II junipers can produce immediate habitat benefits for sage-grouse (Natural Resources Conservation Service 2010).

Juniper/conifer removal projects used for mitigation would focus primarily on the early successive stages of conifer/juniper stands (i.e., Phase I or Phase II juniper) with no cheatgrass component. Removal of juniper/conifer would be done by mechanical means, without the use of chemicals, as follows:

- Phase I juniper/conifer could be treated by having a field crew walk from tree to tree, cutting them into pieces, and scattering them on-site (lop and scatter).
- Phase I or II juniper/conifers could also be removed by being mechanically plucked out of the ground, gathered, and burned.
- Phase II juniper/conifer could be treated using a masticator, a large mechanical device that goes from tree to tree and demolishes the tree with whirling blades; debris is then left on-site (mastication).
- Phase II or III juniper/conifers could be chained.

Some juniper/conifer removal projects would include some level of understory treatment, where needed, and vegetation monitoring until the understory vegetation is established. Locations, methods of treatment,

and understory treatment of removal projects would be approved by the BLM and DOGM so that each treatment site would provide value to the local sage-grouse population.

#### **11.1.1.2. SAGEBRUSH RESTORATION**

Sagebrush restoration creates new habitat for sage-grouse and can be used to create corridors between existing patches of sagebrush to produce larger patches of contiguous habitat. Habitat for sage-grouse consists of a mosaic of vegetation communities dominated by sagebrush and a diverse grass and forb understory across the landscape (UDWR 2009). This mitigation project type increases the quality and quantity of habitat within the landscape, contributing to the long-term survival and success of the sage-grouse.

It is important to note that the successful restoration of disturbed areas can be difficult due to alteration of vegetation, nutrient cycles, topsoils, and living (cryptobiotic) soil crusts exceeding recovery thresholds (Sage-grouse Conservation Objectives Team 2012). Furthermore, sagebrush restoration can be very expensive, require a very long time, and involve complicated landowner/manager partnerships.

New habitat for sage-grouse would be created by augmenting the forage and class diversity of existing dense sagebrush stands and increasing the diversity of understory grasses and forbs in disturbed areas (e.g., roads, un-reclaimed pipeline corridors, and burned areas). Sagebrush restoration projects would include understory (grass and forb) treatments.

Where possible, projects would be placed strategically to decrease habitat fragmentation by connecting existing occupied habitats. All treatments would include the implementation of monitoring to ensure success. Criteria specific to each project and in addition to that defined in this plan that define *restoration* and *success* would be developed by the administrative agency (i.e., the landowner, or private, state, or federal management agency).

#### **11.1.1.3. FORB AND BUNCHGRASS SEEDING**

Bunchgrasses, as opposed to rhizomatous grasses, are recognized as an important component of sage-grouse nesting and brood-rearing habitats (Connelly et al. 2000; Crawford et al. 2004). The structure and abundance of bunchgrasses influence the quality of a sagebrush/bunchgrass community site for nesting sage-grouse. Residual grass in nesting habitats improves hatching success by providing cover for incubating females (Cagney et al. 2009). Herbaceous cover may provide scent, visual, and physical barriers to potential predators (DeLong et al. 1995, as cited in Connelly et al. 2000). In addition to providing cover from predators, forbs are an important food source for sage-grouse broods.

Sage-grouse nesting and brood-rearing habitat is improved by seeding native bunchgrasses and forbs into existing sagebrush stands or into adjacent disturbance, thereby increasing nest and brood success. This is most effective when combined with treating dense sagebrush stands or by brush-beating in strips or patches and inter-seeding with native grasses and forbs (Connelly et al. 2000); however, depending on the specific location of the project, sagebrush stand treatment may not be necessary to complete this treatment type. Understory seeding project sites would be selected by the BLM and DOGM in coordination with the lessee to maximize the benefit of these projects for sage-grouse. Objectives for these projects and criteria for success would be developed in coordination with the BLM. Seed mixtures would be approved by the BLM and UDWR and would be specific to the project site. Domestic animals would be excluded from grazing on the site for a minimum of two years or until the seeds become established. Any sagebrush removal or thinning would be carefully considered and applied at small scales to ensure mature sagebrush stands are still available for sage-grouse using the area for nesting, brood-rearing, and wintering habitats. Under no circumstances would substantial sagebrush stands be treated.

### **11.1.2. Mesic and Riparian Habitat Improvements**

Although the emphasis of the mitigation plan would be on increasing and improving sagebrush habitat, increasing mesic and riparian habitat could also help the sage-grouse population. Sage-grouse have been documented travelling to mesic areas during the peak of the summer, likely following the availability of forbs provided by wet soils. Forbs are an important source of food for pre-laying hens (spring) and juveniles (Connelly et al. 2004), and they often provide increased cover and insect availability. Lack of mesic areas has not been identified as a limiting factor for the local sage-grouse population. However, developing a water source to create wet meadow, or mesic, habitat or to increase the productivity of riparian habitat and increase availability of forbs could benefit the grouse of the Panguitch population. Target features of this type of habitat improvement would include creating areas with saturated soils and little standing water to increase forb production. This project type would not include the installation of guzzlers.

Riparian habitat improvement projects could center on improving access to existing streams by stabilizing and reclaiming existing streambanks or enhancing existing riparian habitat. The Sevier River, Virgin River, and other perennial water in the mitigation plan area are important to sage-grouse. Many of these waters are in poor shape, with little bank vegetation and erosion. An example of a current stream restoration project is the Upper Sevier River Community Watershed Project, which is a collaborative partnership addressing restoration needs (Upper Sevier River Community Watershed Project 2013). More precise information would be needed to identify areas of perennial waters in the mitigation plan area that are in need of improvement. This precise information would be obtained at the implementation stage through site-specific NEPA analyses.

### **11.1.3. Predator Management**

Primary predators for sage-grouse include a combination of raptors (hawks, eagles, owls), corvids (ravens and crows), and mammals (coyotes, raccoons, bobcats, foxes, weasels) that influence nest success, juvenile survival, and adult survival (Schroeder and Baydack 2001).

Potential predator management tactics include (but are not limited to) the following:

- Remove predators in coordination with USDA Wildlife Services through trapping or poisoning eggs.
- Remove roadkill carcasses from quality sage-grouse habitat to reduce their potential to attract raptors and corvids to the area.
- Increase public safety and awareness in areas of high roadkill to reduce the amount of carcasses needing removal.
- Limit existing perch sites and/or reduce perch sites related to mining activities. This will reduce sites from which raptors might hunt sage-grouse by perch-and-pounce methods.
- Install perch deterrents on mining infrastructure.

These tactics may take place concurrently with any of the mitigation project types discussed in this section or as an activity in and of itself.

### **11.1.4. Fence Marking and Removal**

Based on Christiansen (2009), it has been demonstrated that unmarked fences near an active lek can kill a high number of sage-grouse due to fence strikes. This threat can be eliminated by removing fences or can be significantly reduced by increasing the visibility of fences. Christiansen (2009) estimated a 70%

reduction in mortalities could be expected along marked sections of fence. Stevens (2011) similarly predicted that marking fences with vinyl reflectors (flight diverters) reduced collision rates by up to 74%.

To eliminate the threat of collisions, fences would be removed, marked with flight diverters, or equipped with extra stays similar to those used in the Christiansen (2009), Wolfe et al. (2007), and Stevens (2011) studies to increase fence visibility to sage-grouse. Fences would be removed where possible, although some fence sections are necessary to define range allotment and property boundaries. Where removal is not possible, flight diverters would be installed between each fence span (on the top wire, markers would be 2 feet from the post with 4-foot spacing for each subsequent marker; on the third wire, markers would be 4 feet from the post with 4-foot spacing for each subsequent marker). Priority areas for fence removal and marking would be as follows:

- Sections of fence known to cause sage-grouse collisions
- Fences within 1.2 miles of leks (Braun 2006; Stevens 2011) or other high risk areas
- Fences in areas with low slope and terrain ruggedness (Stevens 2011)
- Fence segments bounded by steel t-posts with spans greater than approximately 13 feet (4 meters; Stevens 2011)

If fences have been a substantial source of mortality, once they have been removed or marked, local and annual mortality due to fence collisions would be substantially reduced.

#### **11.1.5. Other**

Other treatment types may effectively mitigate removed or degraded sage-grouse habitat, and they would be evaluated by the BLM and DOGM on a case-by-case basis. Some examples of other treatment types include (but are not limited to) the following:

- Controlling the spread of rabbitbrush habitats
- Treating even-aged or old stands of sagebrush to decrease canopy cover so that they more closely represent nesting, brooding, or wintering habitats
- Increasing the age and class diversity of local sagebrush stands
- Requiring that companies increase employee awareness of the presence of sage-grouse and special treatment of sage-grouse habitat through training and education
- Lowering the speed limits on roads in, adjacent to, or in between sage-grouse habitats

### **11.2. Success Criteria**

Success criteria would be based on creating functioning sage-grouse habitat. Documented use by sage-grouse of the mitigation project would aid in determining success, but would not be required for a successful project. Standards for success of mitigation projects and the statistically valid sampling techniques for measuring success would reflect DOGM's standards of reclamation success, as identified in DOGM's *Vegetation Information Guidelines*, Appendix A (DOGM 1992). Standards for mitigation project success would be based on a comparison of a local reference area of known high-quality sage-grouse habitat with the mitigation project area. The purpose of the comparison would be to evaluate and compare the appropriate vegetation parameters of ground cover, shrub density, frequency, and diversity. Sample adequacy would be determined by the methods outlined in DOGM's *Vegetation Information Guidelines*, Appendix A (DOGM 1992). Methods to be employed to determine that success has been met are presented in Table 3.

**Table 3.** Methods for Comparison between Project and Reference Areas to Determine Success

Cover	Ocular method by square meter quadrats
Shrub density	Point-quarter method and/or belt transects
Frequency	Relative number of times a certain species occurred in the square meter quadrats
Diversity	<p>Diversity will be measured by several methods. The average number of vascular species per square meter quadrat will be obtained by summing the frequency of all species in an area and dividing by 100.</p> <p>Another diversity measurement will be species richness or simply the total number of species encountered in the quadrats for each area.</p> <p>Finally, total diversity will be measured using the MacArthur and Wilson's (1967) formula, where the proportion of the sum frequency of each species of an area is calculated. The proportion of each species will be squared and the values for all species in the area will be summed. This index integrates the number of species encountered and the degree to which frequency of occurrence is equitably distributed among those species. The formula is represented as</p> $\text{Total Diversity} = \frac{1}{\sum P_i^2}$ <p>Where <math>P_i</math> = the proportion of the sum frequency for a community contributed by the <math>i^{\text{th}}</math> species.</p>

These parameters would be considered equal to the approved success standard when they are not less than 90% of the success standard. The sampling techniques for measuring success will use a 90% statistical confidence interval (i.e., one-sided test with a 0.10 alpha error).

Success of the on- and off-tract vegetation treatments would not be dependent on whether sage-grouse are documented using the treated habitat. Use is not required for two reasons:

1. It is highly likely that treatments would be successful because of the requirement (as listed above) to prioritize off-tract vegetation treatments in areas where conifer removal can be done from an intact sagebrush understory immediately adjacent to habitat occupied by sage-grouse, such as those areas analyzed in the BLM's *South Canyon Vegetation Enhancement Project Environmental Assessment* and *Upper Kanab Creek Watershed Improvement Project Environmental Assessment* (BLM 2010, 2011c). Vegetation treatments meeting this requirement are highly likely to quickly increase the availability of sage-grouse habitat (Commons et al. 1999; Baruch-Mordo et al. 2013).
2. Unpredictable environmental events, such as extreme drought or very harsh winter conditions, may preclude grouse individuals from using certain habitat, even if it meets all biological needs. It is unfair to hold the selected lessee to a success criterion that may be out of its control.

There is a risk that the habitat improvement project may not meet success criteria; the lessee would contribute a fixed amount of funding based on the average habitat treatment failure rates that would either be used toward achieving project success or carrying out a replacement project. Thus, to compensate for average habitat treatment failure rates, mitigation ratios could be increased (e.g., 4.3:1 or 4.6:1).

### 11.3. Project Maintenance

All mitigation project sites would be maintained to comply with the established success criteria by the lessee for either the life of the mine or a 10-year bond release period, whichever is greater.

## 12. GREATER SAGE-GROUSE MONITORING

Monitoring the success of mitigation measures to ensure continued success is an important element of the mitigation plan. Monitoring activities would be tied to the mining permit, funded by the selected lessee, and would be led by the administrative agency.

The final monitoring approach for each mitigation project would be formalized in a monitoring strategy that would be reviewed annually, or as necessary, by the administrative agency in coordination with the lessee and with the involvement of DOGM, BLM, UDWR, and USFWS. Potential monitoring protocols include spotlighting, aerial surveys, pellet group counts (density based), noise monitoring relative to the various sage-grouse habitats during coal operations, and lek and brood counts at different sites at the same time. Monitoring protocols and duration would vary for each mitigation project type, and should be timed to appropriately sample the targeted life phase of sage-grouse (lekking, nesting, brood rearing, wintering). The success of each weed management plan would also be monitored on each mitigation project site.

Results of monitoring would be provided to the BLM, DOGM, UDWR, and USFWS for an annual evaluation. A report summarizing project activities and monitoring results would be prepared (funded by the selected lessee) on an annual basis to inform the annual review. The review should continue until all mitigation is deemed to be successfully completed. The monitoring strategy would also include success criteria for each project and project type. Specific success criteria would be developed prior to initiating these actions. Procedures for implementing additional habitat treatments in the event that monitoring detects a failure to meet prescribed objectives or success criteria would be necessary. The anticipated duration and costs for these procedures would be established by the BLM, UDWR, DOGM, and the lessee. The monitoring would be conducted by the BLM, DOGM, or a third-party contractor that is selected by the BLM or DOGM. The lessee would coordinate with the BLM and UDWR to contribute funding toward monitoring the habitat improvement project for three years after its implementation, though the exact timeframe would depend on the project type and monitoring protocols in place.

## 13. ANTICIPATED RESULTS FROM ENFORCEMENT OF PRE-MINING VEGETATION TREATMENT, RECLAMATION, AND ON- AND OFF-TRACT MITIGATION MEASURES

The required pre-mining vegetation treatment, reclamation, and mitigation measures, as detailed in the SDEIS (Section 4.18.2.1.2.1), listed in the design features, and listed in this plan, comply with the IM 2012-043 requirement to “cumulatively maintain and enhance Greater Sage-grouse habitat” by instituting the following requirements:

- Avoiding habitat through the designation of limited-touch areas in sagebrush habitats in the tract (see Figure 2)
- Before mining activities, conducting vegetation treatment on Block Sa (comprising 186.3 acres) to reduce conifer encroachment
- Requiring that Blocks S and NW not be mined simultaneously so one would provide a refuge while the other is experiencing disturbances due to mining
- Reclaiming in-tract sagebrush habitats to vegetation standards that would provide sage-grouse habitat in the long term
- Ensuring a 4:1 ratio of mitigation acres to disturbance acres to increase available habitat in the analysis area in the short term
- Prioritizing off-tract vegetation treatments in areas where conifer removal can be done from an intact sagebrush understory immediately adjacent to habitat occupied by sage-grouse, such as those areas analyzed in the BLM’s *South Canyon Vegetation Enhancement Project*

*Environmental Assessment and Upper Kanab Creek Watershed Improvement Project  
Environmental Assessment* (BLM 2010, 2011c; see Figures 3 and 5)

- Requiring that off-tract vegetation treatment mitigation projects intended to comply with the 4:1 mitigation ratio are completed no more than one year after the corresponding on-tract surface disturbance occurs

The anticipated results from the combined pre-mining vegetation treatment, reclamation, and mitigation actions are based on observations from previously conducted telemetry observations, reclamation projects, and vegetation treatments in the KFO, as described in Section 3.18.3 of the SDEIS. These observations indicate the following:

1. Sage-grouse would occupy vegetation treatment areas, consisting of juniper removal from an intact sagebrush understory (both on- and off-tract), shortly after completion of the vegetation treatment, and in many cases within the following year (Frey 2013; Frey et al. 2014), especially when the treated areas are adjacent to already occupied habitat. Use by sage-grouse of previously completed vegetation treatments is described in detail in Section 3.18.3.4.2.
2. An analysis of habitat use from telemetry data collected from 2005 to 2009 documented birds using both Blocks NW and S year-round (Frey et al. 2013), indicating that Block NW could serve as a refuge while mining activities are conducted on Block S, and vice versa.
3. Successfully reclaimed areas would function as sage-grouse habitat within approximately 15–20 years from the date of completion (Petersen 2013b).
4. Off-tract vegetation treatments would enhance habitat availability and connectivity in the long term, thereby contributing to the genetic resilience of the population.

It is anticipated that sage-grouse would continue to use the limited-touch areas of the tract, Block Sa, and habitat adjacent to but outside of the tract while mining takes place. Pre-mining vegetation treatment of Block Sa would create an initial increase in available habitat. Because sage-grouse currently use the habitat of both Blocks NW and S year-round, it is anticipated that Block NW would serve as a refuge and be used by grouse year-round while portions of Block S are experiencing mine-related disturbances, and vice versa. As the vegetation in reclaimed areas becomes established and begins to resemble sage-grouse habitat, individuals are expected to use these parcels. Successful reclamation would represent an increase in available habitat for the species in the long term because many of these areas are currently degraded and under-used by sage-grouse due to juniper encroachment. And finally, the requirement for off-site vegetation treatments at a ratio of 4 acres for every 1 acre disturbed would increase available habitat for the Panguitch population as a whole, as well as increase connectivity and genetic flow among the population breeding groups. The requirement that the off-site projects are completed no more than one year following the corresponding disturbance in combination with the initial increase in available habitat from treating Block Sa would ensure that the amount of available habitat is maintained throughout the life of the mine.

Compliance with these requirements would ensure there would be no net loss of habitat for Greater Sage-Grouse, and would lead to a net increase of available habitat for the population as a whole in both the short and long term. Many of the locations that would be enhanced, reclaimed, and treated may not otherwise be completed without the funding made available by mining activities. In the long term, the enhanced habitats of the tract, mined areas reclaimed to sagebrush, and increased availability of habitat population-wide would further BLM's objectives of maintaining and enhancing habitat for Greater Sage-Grouse, and would thereby aid in the stabilization or increase of the Panguitch population. The ability to increase habitat availability and connectivity between breeding groups would increase the health and resiliency of the group breeding near the tract, as well as increase the capacity for the population as a whole to increase.



## **14. SUMMARY**

This plan outlines the ways in which the successful lessee of the Alton Coal Tract would commit to offset potential impacts to local populations of sage-grouse from mining activities on the tract. If the BLM's decision following the EIS process is to offer the tract for competitive leasing, the requirements of this mitigation plan would be incorporated as design features appropriate to the alternative selected.

Mitigation activities would occur both on and off the tract, but within the mitigation plan area, as defined in Figure 1. The mitigation planning process is intended to be adaptive. The mitigation requirements (listed in Section 10.1) would be accomplished with coordination from the BLM and DOGM. Success and maintenance of mitigation projects would be determined by the BLM and DOGM.

Avoidance measures are described in the project summary, and would reduce impacts to sage-grouse during mining by restricting operations in certain areas and during certain critical times of the year. Compensatory actions (i.e., habitat improvement projects) would be conducted in the mitigation plan area and would consist of 1) vegetation treatments (consisting of juniper removal, sagebrush restoration, and forb/bunchgrass seeding), 2) mesic and riparian habitat improvements, 3) predator management, 4) fence marking/removal, or 5) other. Monitoring sage-grouse use of the mitigation project area would be incorporated into each mitigation project to evaluate success.

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## **Attachment A.**

**Alton Coal Tract Lease by Application (LBA) Greater Sage-Grouse Mitigation Plan  
Effects on Non-wildlife Resources Analyzed in the SDEIS**





## INTRODUCTION

The *Alton Coal Tract LBA Greater Sage-grouse Mitigation Plan* (sage-grouse mitigation plan) was developed to enhance and protect Greater Sage-Grouse habitat that would be threatened or disturbed by the action alternatives analyzed in the SDEIS (see Section 1 Introduction of sage-grouse mitigation plan). However, implementation of the sage-grouse mitigation plan would also have effects on other, non-wildlife resources that are analyzed in the SDEIS. These resources include vegetation, livestock grazing, fire management, soils, recreation, visual resources, and cultural resources. The potential effects would primarily result from the vegetation treatments required under the sage-grouse management plan.

## SAGE-GROUSE MITIGATION PLAN REQUIREMENTS

The sage-grouse mitigation plan would require the following as design features for the lessee:

- Vegetation treatments (as well as water availability/riparian habitat improvement projects) at a ratio of 4:1 per acre of directly disturbed sage-grouse habitat. Research pertaining to and concurrent with the vegetation treatments (e.g., monitoring bird habitat use, sagebrush canopy measurements) is necessary to ensure appropriate and successful treatments.
- The marking or removal of all fences that occur within 2 miles of the Alton–Sink Valley lek.
- Because coal trucks comprise approximately 4% of the traffic on nearby roads, the proponent would be responsible for funding 4% of the Utah Department of Transportation’s roadkill carcass removal on the coal transportation haul route.
- \$12,000 will be provided every five years to fund predator control actions in the mitigation plan area, focusing on corvid species and red fox. This amount is based on a doubling of the amount that ACD, LLC has contracted with USDA Wildlife Services to spend on predator control from 2011 to 2016 as partial mitigation fulfillment for the Coal Hollow permit (Appendix B of Appendix 3-5 of the *ACD Coal Hollow Mining and Reclamation Plan* [ACD 2009]).

Section 11 (Compensatory Mitigation Projects) of the sage-grouse mitigation plan provides more details about the required mitigation measures.

The sage-grouse mitigation plan’s 4:1 mitigation ratio would require that for every 1 acre of sage-grouse habitat that is disturbed, at least 4 acres of habitat would have to be created or enhanced in the mitigation plan area (see Figure 1). Sage-grouse habitat generally encompasses the sagebrush/grassland, sagebrush/grassland (treated), and rabbitbrush vegetation communities, but sage-grouse have also been known to use meadow, riparian, and annual and perennial grasses vegetation communities.

The alternatives analyzed in the SDEIS would result in varying levels of vegetation treatments being required under the sage-grouse mitigation plan. Under the Proposed Action, approximately 4,612–7,258 acres of sage-grouse habitat in the mitigation plan area would be enhanced through vegetation treatments required by the sage-grouse mitigation plan. Under Alternative C, approximately 3,464–6,052 acres of sage-grouse habitat would be enhanced through vegetation treatments. Under Alternative K1, approximately 1,943–3,656 acres of sage-grouse habitat would be enhanced through vegetation treatments. The effects that these vegetation treatments would have on vegetation, livestock grazing, fire management, cultural resources, visual resources, water resources, and soils in the tract are discussed below.

## AFFECTED ENVIRONMENT

The sage-grouse mitigation plan area corresponds to the Panguitch SGMA, an approximately 607,210-acre area that encompasses the approximately 3,577-acre tract. The tract is in Kane County, Utah, approximately 0.10 mile south of the town of Alton and 2.9 miles east of U.S. Highway 89 (US-89). The tract occurs at approximately 6,900 feet above sea level in the semiarid foothills of the Colorado Plateau Semidesert Province (Woods et al. 2001) of south-central Utah. The tract is in the Alton Amphitheater between the Paunsaugunt Plateau to the northeast, Long Valley (Virgin River) to the west, and approximately 5.0 miles north and northwest of the Grand Staircase-Escalante National Monument. Mean annual precipitation in the town of Alton was approximately 16 inches from 1928 to 2006, and mean annual temperature for this same time period was 60.2 degrees Fahrenheit (F) (Western Regional Climate Center 2006). The Colorado Plateau Province receives most of its precipitation in the form of snow during the winter months; summers are generally hot and dry with a mid- to late-summer monsoon period when frequent thunderstorms occur (2006). The tract is characterized by a series of low-rising hills and benches cut by the north-south-running Kanab Creek and by long diagonal washes that flow from the surrounding mountain ranges. Vegetation in the tract is typical of the Great Basin and includes large open areas of bunchgrass, perennial grasses, and sagebrush interspersed with dense stands of juniper and pinyon pine. Tall fir trees are apparent on the more rugged mountains to the northwest of the tract. Generally, the vegetation cover is continuous across most of the tract, broken by two-track dirt roads and fence lines. A map of the tract in relation to surrounding towns, highways, existing and potential fee coal areas, and other area landmarks is presented in Map 1.1 of the SDEIS (BLM 2014).

Vegetation communities on the tract are typical of what is found in the surrounding Colorado Plateau region, namely pinyon-juniper woodlands, sagebrush shrublands, and mountain brush communities. Vegetation on public lands in the tract is managed by the BLM in accordance with the KFO RMP (BLM 2008). Vegetation treatment and management on public lands provide measures to maintain or improve the overall health of vegetation communities (BLM 2008). Specific management for vegetation targets forests and woodlands, uplands, and riparian and wetland communities through implementation of controls on noxious and invasive weed species and application of *Standards for Rangeland Health and Guidelines for Grazing Management on BLM Lands in Utah* (BLM 1997). Vegetation treatments consist of prescribed fire, mechanical, chemical and biological treatments, woodland product removal, and wildland fire. See Sections 3.15 and 3.5 of the SDEIS for more information about vegetation and fire management, respectively, in the tract.

Livestock grazing in the tract is administered by the BLM in accordance with the *Standards for Rangeland Health and Guidelines for Grazing Management on BLM Lands in Utah* (BLM 1997). These standards and guidelines were instituted for all Utah rangelands and are based on ecological principles that underlie the sustainable production of rangeland resources. Seven grazing allotments encompass 2,143 acres of the tract; two occur completely within the tract and five occur partially within the tract. See Section 3.9 of the SDEIS for more information about livestock grazing in the tract.

Information about cultural resources, visual resources, and soils in the tract can be found in Sections 3.4, 3.2, and 3.13 of the SDEIS, respectively.

## **ENVIRONMENTAL CONSEQUENCES**

### **Vegetation**

The Proposed Action, Alternative C, and Alternative K1 would disturb approximately 1,975 acres, 1,650 acres, and 1,005 acres of vegetation, respectively. All of these disturbed acres would be revegetated according to required reclamation standards. Specific revegetation plans, including target communities for restoration, would be implemented by the lessee in accordance with guidance from the BLM and DOGM. Wetland revegetation plans would have to be made in accordance with U.S. Army Corps of Engineers guidelines and mitigation requirements.

Under the Proposed Action, in addition to the 1,975 acres of reclaimed vegetation, approximately 4,612–7,258 acres of sage-grouse habitat in the mitigation plan area would be enhanced through vegetation treatments required by the sage-grouse mitigation plan. Under Alternative C, in addition to the 1,650 acres of reclaimed vegetation, approximately 3,464–6,052 acres of sage-grouse habitat would be enhanced through vegetation treatments. Under Alternative K1, in addition to the 1,005 acres of reclaimed vegetation, approximately 1,943–3,656 acres of sage-grouse habitat would be enhanced through vegetation treatments.

### **Livestock Grazing**

The potential effects that the sage-grouse management plan would have on livestock grazing are related to the plan's effects on vegetation. Because livestock graze in many of the same vegetation communities that sage-grouse use as habitat, the vegetation treatments required by the sage-grouse mitigation plan would also benefit livestock grazing in the tract. The total acres of vegetation reclamation, as well as acres of vegetation treatments required by the sage-grouse mitigation plan, under each alternative are listed above in the Vegetation section.

### **Fire Management**

All acres of vegetation that would be disturbed by the Proposed Action, Alternative C, or Alternative K1 would be revegetated with suitable native and non-native species according to required reclamation standard. These reclamation requirements would suppress invasive annual grasses such as cheatgrass. This could lead to an improved fire regime conditions class (FRCC) rating on the revegetated areas due to the suppression of cheatgrass and the return of the vegetation community to one with a fire regime of less frequent and lower intensity fires. The additional acres of vegetation treatments required by the sage-grouse management plan would also help suppress invasive species and possibly lead to an improved FRCC rating on the revegetated areas. The total acres of vegetation reclamation under each alternative, as well as acres of vegetation treatments required by the sage-grouse mitigation plan, are listed above in the Vegetation section.

### **Soils**

Most soils in the proposed vegetation treatment areas are suitable for the treatment activities designated for pinyon/juniper treatment, sagebrush treatment, and retreatment. Many of the soil types found in the watershed will and likely did support a wider community of grasses and forbs, with pinyon/juniper as a smaller component of the vegetation community. Removal of pinyon/juniper would allow perennial grasses and forbs to return to the site, adding stability to the soil layers and reducing upland erosion.

Where soils are more susceptible to erosion, care would be taken to reduce long-term exposure of the soil surface. This impact would be minimized by planting native and non-native species and leaving “mulch, on-site.

Disturbance to biological crusts from treatment methods may impact existing cryptobiotic communities, but would not impact them any more than may have already occurred from past disturbance activities (grazing, previous land management, wildlife use, etc.).

## **Recreation**

Current recreation uses and opportunities include dispersed activities such as hunting, sightseeing, driving for pleasure, accessing canyons for scenic photography or canyoneering, studying nature, photographing wildlife, and hiking/backpacking/camping. These activities could be temporarily disrupted or displaced during actual vegetation treatments. In the short term, post-treatment areas could become less or more attractive to the recreating public, depending on the nature of their activities and their preferred settings. For instance, creating more open areas could enhance wildlife viewing opportunities, but it could also discourage photographers in search of totally natural-appearing, unaltered landscapes. As native vegetation becomes reestablished on treatment areas, those sites will also probably attract some recreation activities while discouraging others, due to the altered vegetative cover, scenery, naturalness, and use by wildlife species.

## **Visual Resources**

The proposed vegetation treatments would be designed to mimic natural-appearing edges between vegetation types and to resemble natural openings and clearings in the vegetation patterns such that contrasts in form, line, color, and texture would be avoided or minimized to meet VRM objectives. If heavy equipment is used to implement treatments, its presence could create visual contrasts, but these would be short term.

In the long term, when stands of various-aged vegetation and a less homogeneous mix of vegetation are established, the visual variety created by the proposed vegetation treatments could result in a more interesting visual landscape.

Treatment areas could be noticeable to the casual observer during implementation and during the short term when dead vegetation or bare ground is visually obvious, but visual resource objectives would be met for the long term in all VRM Class areas when Proposed Action design criteria are followed.

## **Cultural Resources**

The potential effects that the sage-grouse management plan would have on cultural resources would result from the surface disturbance caused by vegetation treatments. Many of the vegetation treatments required by the sage-grouse mitigation plan would involve removal of pinyon-juniper trees, which entails some surface disturbance. This surface disturbance could affect previously undiscovered cultural resources. To prevent this, site-specific analyses would be conducted prior to implementing any vegetation treatments. The total acres of vegetation treatments required by the sage-grouse mitigation plan under each alternative are listed above in the Vegetation section.

## **Visual Resources**

The vegetation treatments would be designed to mimic natural appearing edges between vegetation types and to resemble natural openings and clearings in vegetation patterns. Thus, contrasts in form, line, color, and texture would be avoided or minimized so as to meet visual resource management (VRM) objectives. If heavy equipment is used to implement the vegetation treatments, its presence could create visual contrasts, but these would be short term.

In the long term, when stands of various aged vegetation and a less homogenous mix of vegetation are established, the visual variety created by the proposed action could result in a more interesting visual landscape.

Treatment areas may be noticeable to the casual observer during implementation and during the short term when dead vegetation or bare ground is visually obvious; however, visual resource objectives would be met for the long term in all VRM class areas when design criteria are followed.

## **Soils**

Most of the soils in the tract are suitable for the vegetation treatment activities designated for pinyon-juniper treatment and sagebrush treatment. Many of the soil types found in the tract would likely support a wider community of grasses and forbs, with pinyon-juniper as a smaller component of the vegetation community. Removal of pinyon-juniper would allow perennial grasses and forbs to return to the site, adding stability to the soil layers and reducing upland erosion.

For soil types that are more susceptible to erosion, care should be taken to reduce long-term exposure of the soil surface. This impact would be minimized by planting native and non-native species, leaving mulch on site, and by intermixing smaller (< 1,000 acres) treatment and non-treatment polygons.

## **Cumulative Effects**

The vegetation treatments required by the sage-grouse mitigation plan would add cumulatively to the approximately 75,815 acres of surface disturbance caused by reasonably foreseeable future actions in the cumulative impacts analysis area (CIAA) (see Section 4.19 Cumulative Impacts in the SDEIS). Of these 75,815 acres, approximately 60,000 acres (79%) are expected to result from vegetation treatments. Depending on the alternative selected, the sage-grouse mitigation plan could have a cumulative effect ranging from 0 acres (No Action Alternative) to approximately 7,258 acres (Proposed Action) of surface disturbance. The maximum of 7,258 acres of vegetation treatments under the Proposed Action would represent an approximately 12% increase in the projected 60,000 acres of future vegetation treatments in the CIAA. The potential effects of the sage-grouse management plan would be temporarily adverse in the short term as a result of the surface disturbance required for some of the vegetation treatments, but they would have countervailing beneficial impacts in the long term. The long-term benefits would result from the offsetting of habitat and vegetation impacts caused by mining the tract, as described in the SDEIS.

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